

units, and output units is reduced, thereby reducing development time for creating new virtual worlds.

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Having connected the data flow network as desired, input data from sensors (including the system clock) are fed into the data flow network. When an output corresponding to one of the points changes, the modified position or orientation of the point is displayed to any of the users looking at the updated point. In addition, the system traverses the hierarchy of points from the updated points "downward" in the tree in order to update the points whose positions or orientations depend on the repositioned or reoriented point. These points are also updated in the views of the users looking at these points.--

Page 9, line 29, after "224." insert {--In an alternate embodiment, after the "No" branch of step 228, or after either of steps 234 and 236, control is passed to a separate condition-testing step to determine if a user's viewpoint has changed. If not, control returns to either step 220 or step 218 as in the first embodiment. However, if a user's viewpoint has changed, the new viewpoint is determined and control is then passed to step 218.--

IN THE CLAIMS

Please amend Claims 1, 6, 13, 15, 26 and 30 as follows:

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--1. (Amended) A simulating apparatus comprising:
modeling means for creating a model of a physical environment in a computer database;

first body sensing means, disposed in close proximity to a part of a first body, for sensing a [the] physical status of the first body part relative to a first reference position;

second body sensing means, disposed in close proximity to a part of a second body, for sensing [the] a physical status of the second body part relative to a second reference position;

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first body emulating means, coupled to the first body sensing means, for creating a first cursor in the computer database, the first cursor including plural first cursor nodes and emulating the physical status of the first body part, the first body emulating means including a first point hierarchy and a first data flow network, the first point hierarchy for controlling a shape and an orientation of the first cursor and for attaching each of the plural first cursor nodes hierarchically with at least one other of the plural first cursor nodes, the first data flow network for controlling motion of the first cursor and the first data flow network including a first interconnection of first input units, first function units and first output units, the first input units receiving the physical status of the first body part, each first function unit including at least one input and at least one output and calculating, based on the at least one input, a value for each of the at least one output, and the first output units for producing position and orientation values for a portion of the plural first cursor nodes;

first integrating means, coupled to the modeling means and to the first emulating means, for integrating the first cursor with the model;

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second body emulating means, coupled to the second body sensing means, for creating a second cursor in the computer database, the second cursor including plural second cursor nodes and emulating the physical status of the second body part, the second body emulating means including a second point hierarchy and a second data flow network, the second point hierarchy for controlling a shape and an orientation of the second cursor and for attaching each of the plural second cursor nodes hierarchically with at least one other of the plural second cursor nodes, the second data flow network for controlling motion of the second cursor and the second data flow network including a second interconnection of second input units, second function units and second output units, the second input units receiving the physical status of the second body part, each second function unit including at least one input and at least one output and calculating, based on the at least one input, a value for each of the at least one output, and the second output units for producing position and orientation values for a portion of the plural second cursor nodes; and

second integration means, coupled to the modeling means and to the second body emulating means, for integrating the second cursor with the model.

Claim 6, line 2, before "body" insert --first--.

Claim 13, line 2, before "body" insert --first--.

Claim 15, line 2, before "body" insert --second--.

26. (Amended) A simulating apparatus comprising:

a modeling means for creating a virtual world model of a physical environment in a computer database;

a first sensor for sensing a first real world parameter;

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first emulating means, coupled to the first sensor for emulating a first virtual world phenomenon in the virtual world model, the first emulating means including a first point hierarchy and a first data flow network, the first point hierarchy for controlling a shape and an orientation of a first cursor, including plural first cursor nodes, and for attaching each of the plural first cursor nodes hierarchically with at least one other of the plural first cursor nodes, the first data flow network for controlling motion of the first cursor and the first data flow network including a first interconnection of first input units, first function units and first output units, the first input units receiving the physical status of the first body part, each first function unit including at least one input and at least one output and calculating, based on the at least one input, a value for each of the at least one output, and the first output units for producing position and orientation values for a portion of the plural first cursor nodes;

a second sensor for sensing a second real world parameter; and

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second emulating means, coupled to the second sensor, for emulating a second virtual world phenomenon in the virtual world model, the second emulating means including a second point hierarchy and a second data flow network, the second point hierarchy for controlling a shape and an orientation of a second cursor, including plural second cursor nodes, and for attaching each of the plural second cursor nodes hierarchically with at least one other of the plural second cursor nodes, the second data flow network for controlling motion of the second cursor and the second data flow network including a second interconnection of second input units, second function units and second output units, the second input units receiving the physical status of the second body part, each second function unit including at least one input and at least one output and calculating, based on the at least one input, a value for each of the at least one output, and the second output units for producing position and orientation values for a portion of the plural second cursor nodes.

30. (Amended) A simulating method, comprising the steps of:

creating a virtual environment;

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[defining nodes of] constructing virtual objects within the virtual environment using a point hierarchy and a data flow network for controlling motion of nodes of the virtual objects wherein the step of constructing includes

attaching each node of the virtual objects hierarchically with at least one other of the nodes to

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form the point hierarchy, each of the nodes of the
virtual objects having a position and an orientation, and
building the data flow network as an
interconnection of input units, function units and
output units, wherein said input units receive data
from sensors and output the received data to at
least one of said function units, wherein each of
said function units includes at least one input and
at least one output, each function unit generating a
value for the at least one output based on at least
one of data received from at least one of the input
units and data received from an output of at least
one other of said function units, and wherein the
output units generate the position and the
orientation of a portion of the nodes of the virtual
objects;

inputting data from sensors worn on bodies of at least
two users;

converting the inputted data to position and orientation
[values] data;

[associating] modifying, by using the data flow network,
the position and the orientation [data with said] of the nodes
of the virtual objects based on the position and orientation
data;

determining view points of said at least two users;
receiving a synchronization signal;